

# WRRC UPDATE

(print version)



## Update from the Western Regional Research Center

Pacific West Area / Agricultural Research Service / United States Department of Agriculture

Tuesday, January, 29, 2008

Rev. (Tuesday, January, 29, 2008: 11:28:03 AM)

Online version with active links at  
Center, Unit, and author information at

<http://ars.usda.gov/pwa/wrrc/updates>  
<http://ars.usda.gov/pwa/wrrc>

### Table of Contents

#### THE CENTER

- Center announcement regarding Outstanding Early Career Scientist Award
- Dwayne Buxton, Pacific West Area Director, retires after 29 years of Federal service
- WRRC Research Partnership Meeting to be held March 5, 2008

#### PARTNERING OPPORTUNITIES

- Partnering with USDA

#### BIOFUELS

- Bioenergy production from a mixture of dairy cow manure and food waste

#### ENVIRONMENTAL QUALITY/INVASIVE SPECIES

- ARS responds to aquatic weed invasions at Lake Tahoe

#### FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION

- Antioxidants control genes that suppress aflatoxin biosynthesis
- Flour quality and allergenicity in wheat
- Natural chemicals found that enhance antifungal activity of commercial fungicides
- Navel orangeworm activity can promote aflatoxin contamination of almonds
- Research partners sought for developing the new bioenergy crop, switchgrass
- WRRC's Genomics and Gene Discovery Research Unit continues its work on sequencing *Brachypodium*

#### FOOD PROCESSING AND SAFETY

- Factors from dairy wastewater lagoons influence the survival of *E. coli*
- First complete genome sequence and analysis of *A. butzleri*
- Identification of a novel prion conformer
- Study on *E. coli* O157:H7 and feral swine
- Study on *E. coli* O157:H7 in a major produce production region in California

#### HEALTHY FOODS

- Commercial partners sought to further develop legume snacks
- New treats developed from ARS technology

## THE CENTER

### Center announcement regarding Outstanding Early Career Scientist Award



Washington, D.C. - location of ARS Annual Recognition Program on February 12, 2008. Photo by Scott Bauer.

Dr. Zhongli Pan, Research Engineer, Processed Foods Research Unit, USDA-ARS-WRRC, won the USDA ARS Herbert L. Rothbart Outstanding Early Career Scientist Award of 2007 for his Innovative, High Impact Engineering Solutions to Value-added Processing of Agricultural Commodities. He will be recognized at the ARS Annual Recognition Program on February 12, 2008, in Washington, DC. Dr. Pan has also been nominated for the Presidential Early Career Awards for Scientists and Engineers.

Contact: Zhongli Pan (zpan@pw.usda.gov)  
Unit PFR Processed Foods Research  
KEYS: \* THE CENTER \* food engineering \*

Record ID # 65

Mon, 28 Jan 2008 10:00 PDT

### Dwayne Buxton, Pacific West Area Director, retires after 29 years of Federal service



Dwayne Buxton and Veronica Laird, Executive Assistant. Photo courtesy of Delilah Wood.

Dwayne Buxton, Pacific West Area Director, retired on January 3, 2008. Dr. Buxton retired with 29 years of Federal service, including 26 years with the Agricultural Research Service (ARS).

Dr. Buxton came to ARS as a Plant Physiologist in Ames, Iowa, in 1981, after serving as Assistant Professor and Professor of Agronomy at the University of Arizona and Oregon State University, respectively. He became a Research Leader of the former Field Crops Research Unit in Ames in 1990, and then joined the National Program Staff (NPS) in 1997 as National Program Leader for Oilseeds and Bioscience. Following a brief detail as Associate Director of the Midwest Area in 2000, he returned to Beltsville, Maryland, to serve as Deputy Administrator for NPS from 2000-2004. Finally, he became Director of the Pacific West Area in 2004.

In addition to being respected and admired as a leader and manager, Dr. Buxton was an outstanding researcher as a Plant Physiologist early in his ARS career. Focusing on forage and crop physiology, he conducted innovative research on developing forages with insect resistance, using crops and forage grasses for biomass production, and improving overall forage and crop quality.

--Excerpt from November 13, 2007 memo from Edward B. Knipping, Administrator

Contact: James N. Seiber (jseiber@pw.usda.gov)  
Unit WRRC  
KEYS: \* THE CENTER \*

Record ID # 80

Mon, 28 Jan 2008 10:00 PDT

## WRRC Research Partnership Meeting to be held March 5, 2008



WRRC Laboratory, Albany, California.

On March 5, 2008 the Western Regional Research Center (WRRC) will host its annual Research Partnership Meeting. The general aim of this event is information flow between WRRC, the ARS' largest and principal research location in the West, and its customers, stakeholders and supporters. Last year, 25 individuals representing food and agricultural organizations and companies participated in the meeting. Specifically, these meetings highlight the many resources available to WRRC partners and provides an opportunity for WRRC to receive input from partners on issues that can benefit from ARS research.

Contact: James N. Seiber (jseiber@pw.usda.gov), David Nicholson (drn@pw.usda.gov)  
Unit: WRRC  
KEYS: \* THE CENTER \*

Record ID # 79

Mon, 28 Jan 2008 10:00 PDT

## PARTNERING OPPORTUNITIES

### Partnering with USDA



WRRC and the Agricultural Research Service actively seek partners for technology transfer to ensure effective use of the science and technology that we create. Most research programs described in this newsletter would benefit from, and are available to, commercial partners. Partnerships can take multiple forms as described in the link "More Information" below.

More about this item: <http://www.ars.usda.gov/Business/Business.htm?modecode=53-25-00-00>

Contact: David Nicholson (drn@pw.usda.gov), Kristin Kimball (kristin.kimball@ars.usda.gov)  
KEYS: \* PARTNERING OPPORTUNITIES \*

Record ID # 81

Mon, 28 Jan 2008 10:00 PDT

## BIOFUELS

### Bioenergy production from a mixture of dairy cow manure and food waste



Combined with food waste, dairy cow manure is a promising biofuel source. Photo by Scott Bauer.

Alternative energy products are needed to reduce our dependence on foreign petroleum. In addition, dairy cow manure must be treated to reduce pathogens which can cause human disease. Dairy manure and food waste can both be used to generate methane, but neither is ideal. Manure is a well buffered substrate that produces methane slowly, and food waste produces methane rapidly but is poorly buffered, which results in the inhibition of methane production. In a collaboration with UC Davis, our scientists discovered that a mixture of food waste and manure digests well, producing methane, reducing pathogens in the waste, and generating a compost suitable as a soil conditioner/fertilizer. This discovery has the potential to produce biofuel while reducing pathogens in waste and wastewater. This work has been submitted for publication.

Contact: John Mark Carter (mcarter@pw.usda.gov), Jeffery McGarvey (mcgarvey@pw.usda.gov)  
Unit: FCR Foodborne Contaminants  
KEYS: \* BIOFUELS \* dairy \* beef \* pathogens \* energy \* agricultural engineering \* microbiology \*

Record ID # 77

Mon, 28 Jan 2008 10:00 PDT

## ENVIRONMENTAL QUALITY/INVASIVE SPECIES

### ARS responds to aquatic weed invasions at Lake Tahoe



*Aerial view of Lake Tahoe.*

Lake Tahoe is considered one of the world's most unique alpine, low-nutrient (oligotrophic) lakes. However, its pristine status has been threatened by a number of events such as massive logging and clear-cutting during the California and Nevada Gold/Silver rushes, and most recently, urbanization and tourism over the past 40 years. Unfortunately, introductions of invasive aquatic weeds (and some non-native warm water fish) followed the rapid development of the Tahoe Basin, probably beginning in the late 1960's with the construction of the Tahoe Keys Marina along the south shore. Dr. Lars Anderson, a plant physiologist with the EIWR in Davis began research on, and delineation of, Eurasian watermilfoil infestations in 1995 and over the subsequent 10 years conducted six whole-lake surveys. <br>

In 2008, Dr. Anderson will continue his work at Lake Tahoe as part of a multi-disciplinary project at the Tahoe Keys aimed at reducing impacts of Eurasian watermilfoil and reducing habitat for non-native warm water fish that interfere with native fish populations. He will serve as ARS representative on the newly formed Lake Tahoe Aquatic Invasive Species Coordinating Committee.

Contact: Lars Anderson (lwanderson@ucdavis.edu)  
Unit: EIW Exotic and Invasive Weeds  
KEYS: \* ENVIRONMENTAL QUALITY/INVASIVE SPECIES \* invasive alien weed \* plant physiology \*

Record ID # 75

Mon, 28 Jan 2008 10:00 PDT

## FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION

### Antioxidants control genes that suppress aflatoxin biosynthesis



*Photo by Jack Dykinga.*

Plant Mycotoxin Research scientists, in collaboration with ARS scientists from New Orleans and the J. Craig Venter Institute, have found a group of genes, peroxiredoxins, that can shut down aflatoxin biosynthesis. Previously, PMR scientists discovered that certain natural antioxidants, such as gallic acid, could prevent aflatoxin biosynthesis (Mahoney and Molyneux 2004). Using a recently available genetic tool called microarray analysis, the collaborating team of scientists were able to show that antioxidants turned on this group of genes. Peroxiredoxins remove signals that trigger aflatoxin biosynthesis. This discovery allows development of strategies to regulate these genes so that aflatoxin is not produced when the fungus infects certain agricultural products, such as peanuts, corn, cotton and tree nuts.

More about this item: [http://ars.usda.gov/research/publications/publications.htm?seq\\_no\\_115=219995](http://ars.usda.gov/research/publications/publications.htm?seq_no_115=219995)

Contact: Bruce Campbell (bcc@pw.usda.gov), Russell Molyneux (molyneux@pw.usda.gov), Kathleen - Kathy Chan (kchan@pw.usda.gov), Jong Heon Kim (jongheon.kim@ars.usda.gov), Noreen Mahoney (nmahoney@pw.usda.gov)  
Unit: PMR Plant Mycotoxin Research  
KEYS: \* FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION \* toxin \* microbiology \*

Record ID # 67

Mon, 28 Jan 2008 10:00 PDT

## Flour quality and allergenicity in wheat



Rooftop Greenhouse at Western Regional Research Center.

Researchers at the ARS in the Crop Improvement Utilization Research Unit are working on a project which investigates how high temperatures during wheat grain development influence flour quality and allergenicity. Using tools of molecular biology, protein chemistry and proteomics, the project goals are to determine the basis for changes in flour protein composition and quality that result from exposure to high temperatures during wheat grain development. The project will also identify and characterize wheat proteins responsible for human sensitivities and allergies and develop methods to detect allergenic proteins in downstream products.

More about this item:<http://www.ars.usda.gov/Research/docs.htm?docid=12824>

Contact: Maureen Whalen (mwhalen@pw.usda.gov), William Hurkman (bhurkman@pw.usda.gov), Frances Dupont (fmd@pw.usda.gov), William Vensel (vensel@pw.usda.gov), Donald Kasarda (kasarda@pw.usda.gov), Susan Altenbach (altnbach@pw.usda.gov)

Unit CIU Crop Improvement Utilization

KEYS: \* FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION \* wheat \* grain \* proteomics \* molecular biology \* chemistry \*

Record ID # 74

Mon, 28 Jan 2008 10:0:0 PDT

## Natural chemicals found that enhance antifungal activity of commercial fungicides



Photo by Scott Bauer.

Plant Mycotoxin Research scientists have discovered a number of natural phenolic compounds that improve the antifungal activity of commercial fungicides. These phenolics act as chemosensitizing agents that disrupt the fungal cell in response to stress. Such chemosensitizing enhancement has been found to be effective against pre- and post-harvest fungal pathogens of fruits, such as apples and oranges.

More about this item:[http://ars.usda.gov/research/publications/publications.htm?seq\\_no\\_115=203769](http://ars.usda.gov/research/publications/publications.htm?seq_no_115=203769)

Contact: Bruce Campbell (bcc@pw.usda.gov), Russell Molyneux (molyneux@pw.usda.gov), Kathleen - Kathy Chan (kchan@pw.usda.gov), Jong Heon Kim (jongheon.kim@ars.usda.gov), Noreen Mahoney (nmahoney@pw.usda.gov)

Unit PMR Plant Mycotoxin Research

KEYS: \* FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION \* toxin \* microbiology \* biological control \*

Record ID # 71

Mon, 28 Jan 2008 10:0:0 PDT

## Navel orangeworm activity can promote aflatoxin contamination of almonds



Aspergillus spores on the legs of the navel orangeworm larva. Photo courtesy Jeffrey Palumbo.

Scientists in the Plant Mycotoxin Research Unit (PMR) at WRRRC are seeking to develop a new approach to controlling navel orangeworm (NOW) on tree nuts. These scientists discovered that NOW can carry the spores of fungi that create aflatoxin. NOW feeding damage and aflatoxin contamination are major problems for the tree nut industries in California. When the NOW feed on the nuts, spores of these fungi have an easier time infecting the nut kernels. PMR scientists are currently trying to identify plant odors that female moths of NOW use to find tree nuts. The PMR scientists anticipate that once these odors are discovered, they can be used to attract and trap the moths. Alternatively, these attractants could be incorporated into a pesticide. In this manner, only the NOW moths would be attracted to places where the pesticide is placed and avoid the potential for harming non-pestiferous species of insects. Funding for the pilot study on NOW was provided by the Almond Board of California.

More about this item:<http://199.199.209.134/email/almond/eNewsletter/December/eNewsletter-December.html#Gap>

Contact: Bruce Campbell (bcc@pw.usda.gov), Jeffrey Palumbo (palumbo@pw.usda.gov), Douglas Light (dlight@pw.usda.gov)

Unit PMR Plant Mycotoxin Research

KEYS: \* FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION \* nuts \* toxin \* entymology \*

Record ID # 73

Mon, 28 Jan 2008 10:0:0 PDT



## Research partners sought for developing the new bioenergy crop, switchgrass



Switchgrass, *Panicum virgatum*.  
Photo by John Berdahl.

Genomics researchers are heavily engaged in switchgrass research, working hard to develop this new energy crop. While WRRRC already has commercial collaborations related to switchgrass, there may be the opportunity for more. Please contact us if your company or organization is interested in possibly forming a research partnership in respect to developing new / better forms of switchgrass. Contacts: John Vogel, Christian Tobias.

Contact: John Vogel (jvogel@pw.usda.gov), Christian Tobias (ctobias@pw.usda.gov)

Unit: GGD Genomics and Gene Discovery

KEYS: \* FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION \* switch grass \* energy \* agricultural engineering \*

Record ID # 83

Mon, 28 Jan 2008 10:00 PDT

## WRRC's Genomics and Gene Discovery Research Unit continues its work on sequencing Brachypodium



WRRC researchers are collaborating with other university and federal laboratory scientists who are working to "map" the entire genome of a model grass, in this case Brachypodium. Once the entire genome of Brachypodium is known, researchers will be able to apply various tools and techniques to the model, which will hopefully lead to the more rapid development of new cultivars, as well as the improvement of existing cultivars.

More about this item: <http://brachypodium.pw.usda.gov>

Contact: Olin Anderson (oanderson@pw.usda.gov)

Unit: GGD Genomics and Gene Discovery

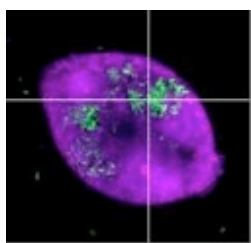
KEYS: \* FOOD AND CROP IMPROVEMENT FOR PRODUCTION/PROTECTION \* grass \* energy \* genome sequence \*

Record ID # 82

Mon, 28 Jan 2008 10:00 PDT

## FOOD PROCESSING AND SAFETY

### Factors from dairy wastewater lagoons influence the survival of E. coli



Photomicrograph of an uncharacterized protozoan from manure wastewater (purple) that has consumed GFP-labeled E. coli O157:H7 (green). Courtesy of Chester Sarreal.

Every year millions of Americans are affected by foodborne illnesses such as E. coli O157:H7. Our scientists observed survival of E. coli O157:H7 is inhibited by native microorganisms and certain organic extracts of dairy wastewater. Follow-up studies should help identify specific organisms and naturally-occurring chemicals that may be added to waste and wastewater to reduce pathogens. This work has been submitted for publication.

Contact: John Mark Carter (mcarter@pw.usda.gov), Subbarao Ravva (subba@pw.usda.gov)

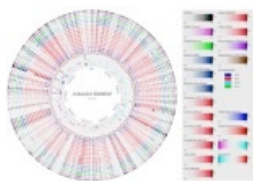
Unit: FCR Foodborne Contaminants

KEYS: \* FOOD PROCESSING AND SAFETY \* dairy \* pathogens \* animal pathology \*

Record ID # 72

Mon, 28 Jan 2008 10:00 PDT

## First complete genome sequence and analysis of *A. butzleri*



Genome BLAST atlas of *A. butzleri* RM4018.

William Miller, a molecular biologist in the Produce Safety and Microbiology Research Unit at WRRRC, and collaborators in the US, Europe and Australia, published in the online open access journal, PLoS One, the first complete genome sequence and analysis of the Epsilonproteobacterium *Arcobacter butzleri*. The analyses indicated that a large portion of the genome of *A. butzleri*, a member of the Campylobacteraceae, is devoted to growth and survival under diverse environmental conditions, and is a free-living, water-borne organism that might be classified rightfully as an emerging pathogen. The genome sequence and analyses will assist in understanding how this organism may be a bridge between the environment and mammalian hosts.

More about this item: <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0001358>

Contact: William Miller ([bmiller@pw.usda.gov](mailto:bmiller@pw.usda.gov))

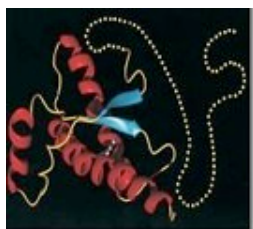
Unit PSM Produce Safety and Microbiology

KEYS: \* FOOD PROCESSING AND SAFETY \* pathogens \* environment \* microbiology \* genome sequence \*

Record ID # 68

Mon, 28 Jan 2008 10:0:0 PDT

## Identification of a novel prion conformer



Hypothetical prion protein (PrP) structure. Graphic: (Kurt Wuthrich) *Proc. Natl. Acad. Sci. USA*, 97, 145 (2000).

Prion diseases such as bovine spongiform encephalopathy (BSE) are caused by a poorly understood process of misfolding protein in the brain. Protein Misfolding Cyclic Amplification is a means of reproducing this protein misfolding in a test tube, instead of an animal. Our scientists used this method to characterize a novel conformation involved in the prion misfolding process. This observation is influencing the technology and understanding of in vitro prion conversion in other labs. The work is currently in press in *Protein & Peptide Letters*: "Sonication Induced Intermediate in Prion Protein Conversion," Audrius A. Zukas, Cathrin E. Bruederle, and John M. Carter.

Contact: Cathrin Bruederle ([cbruederle@pw.usda.gov](mailto:cbruederle@pw.usda.gov)), John Mark Carter ([mccarter@pw.usda.gov](mailto:mccarter@pw.usda.gov))

Unit FCR Foodborne Contaminants

KEYS: \* FOOD PROCESSING AND SAFETY \* beef \* pathogens \* proteomics \* animal pathology \*

Record ID # 78

Mon, 28 Jan 2008 10:0:0 PDT

## Study on *E.coli* O157:H7 and feral swine



Feral pig. Photo courtesy G. Wiscomb, USDA Wildlife Services (APHIS).

Researchers in the Produce Safety and Microbiology Research Unit at WRRRC and their collaborators recently published a study in *Emerging Infectious Disease* entitled "Escherichia coli O157:H7 in Feral Swine Near Spinach Fields and Cattle, Central California Coast." The study investigated involvement of feral swine in contamination of agricultural fields and surface waterways with *Escherichia coli* O157:H7 after a nationwide outbreak was traced to bagged spinach from California. Isolates from feral swine, cattle, surface water, sediment, and soil at one ranch were matched to the outbreak strain.

More about this item: <http://www.cdc.gov/eid/content/13/12/1908.htm>

Contact: Michael Cooley ([mcooley@pw.usda.gov](mailto:mcooley@pw.usda.gov)), Robert Mandrell ([mandrell@pw.usda.gov](mailto:mandrell@pw.usda.gov))

Unit PSM Produce Safety and Microbiology

KEYS: \* FOOD PROCESSING AND SAFETY \* leafy vegetables \* pathogens \* microbiology \*

Record ID # 70

Mon, 28 Jan 2008 10:0:0 PDT

## Study on E.coli O157:H7 in a major produce production region in California



*Relatedness of strains of E. coli O157:H7 isolated and fingerprinted in this study.*

Researchers in the Produce Safety and Microbiology Research Unit at WRRRC and their collaborators recently published a study in PLoS ONE entitled "Incidence and tracking of Escherichia coli O157:H7 in a major produce production region in California." The study was stimulated by suspected pre-harvest contamination of leafy vegetables grown in this region and associated with multiple outbreaks of E. coli O157:H7.

More about this item:<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0001159>

Contact: Michael Cooley (mcooley@pw.usda.gov), Robert Mandrell (mandrell@pw.usda.gov)

Unit PSM Produce Safety and Microbiology

KEYS: \* FOOD PROCESSING AND SAFETY \* leafy vegetables \* pathogens \* microbiology \*

Record ID # 69

Mon, 28 Jan 2008 10:00 PDT

## HEALTHY FOODS

### Commercial partners sought to further develop legume snacks



*Crisp, crunchy, protein-rich snacks made using a process from ARS and Washington State University scientists. Photo-James Pan.*

WRRRC researcher Jose Berrios and his colleagues at Washington State University have been involved in developing nutritious, great-tasting legume snacks which are rich in protein and dietary fiber. They are applying to patent this technology, and are looking for commercial partners.

More about this item:<http://www.ars.usda.gov/is/pr/2007/071114.htm>

Contact: Jose Berrios (jberrios@pw.usda.gov)

Unit PFR Processed Foods Research

KEYS: \* HEALTHY FOODS \* beans \* food science \* food engineering \*

Record ID # 64

Mon, 28 Jan 2008 10:00 PDT

### New treats developed from ARS technology



*ARS scientists in California invented the patented process used in making FruitFast's MixedBerry bars. Photo courtesy of FruitFast.*

Flavorful berries and bits of rich dark chocolate star in the latest entries in an expanding line of all-natural fruit bars made using technology from Agricultural Research Service (ARS) scientists.

FruitFast of Eastport, Mich., holds a license from ARS for the process used to create the bars, which are on sale at health food and specialty grocery stores in the Midwest, and on the Web at [www.FruitFast.com/](http://www.FruitFast.com/).

More about this item:<http://www.ars.usda.gov/is/pr/2007/071212.htm>

Contact: Tara McHugh (thm@pw.usda.gov), David Nicholson (drn@pw.usda.gov)

Unit PFR Processed Foods Research

KEYS: \* HEALTHY FOODS \* fruits \* food science \* food engineering \*

Record ID # 66

Mon, 28 Jan 2008 10:00 PDT